Environmental Health Activities in Massachusetts

NCEH in Partnership with Massachusetts

The National Center for Environmental Health (NCEH) is part of the Centers for Disease Control and Prevention (CDC). NCEH's work focuses on three program areas: identifying environmental hazards, measuring exposure to environmental chemicals, and preventing health effects that result from environmental hazards. NCEH has approximately 450 employees and a budget for 2004 of approximately $189 million; its mission is to promote health and quality of life by preventing or controlling diseases and deaths that result from interactions between people and their environment.

NCEH and partners in **Massachusetts** collaborate on a variety of environmental health projects throughout the state. In **fiscal years 2000–2004**, NCEH awarded more than **$10.5 million** in direct funds and services to Massachusetts for various projects. These projects include activities related to addressing asthma from a public health perspective, evaluating phthalate exposures, and preventing childhood lead poisoning. In addition, Massachusetts benefits from national-level prevention and response activities conducted by NCEH or NCEH-funded partners.

Identifying Environmental Hazards

NCEH identifies, investigates, and tracks environmental hazards and their effects on people's health. Following are examples of such activities that NCEH conducted or supported in **Massachusetts**.

Asthma

- **Inner-City Asthma Intervention**—NCEH funded **Baystate Medical Center** in **Springfield** to provide asthma education and individualized asthma control plans to inner-city families. The Inner-City Asthma Intervention program was directed toward health organizations that treat low-income inner-city children. The program's objective was to create asthma patient management programs where none exist. In this program, a master's level social worker tailored the intervention to the needs of the individual children. The social worker worked closely with the children's families and helped the families address a myriad of problems related to their children's asthma. Funding began in fiscal year 2001 and ended in fiscal year 2003.

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- **Addressing Asthma from a Public Health Perspective**—NCEH is funding the **Massachusetts Department of Public Health (MDPH)** to develop program and managerial infrastructure within the **MDPH Division for Special Health Needs** and to enhance the existing asthma surveillance system in Massachusetts. NCEH is also funding MDPH to develop a comprehensive state asthma plan and a network of community-based coalitions linked to the Massachusetts Asthma Planning Collaborative Initiative. Funding began in fiscal year 2003 and continues through fiscal year 2006.

Environmental Public Health Tracking

- **Infrastructure Enhancement and Data Linkage Demonstration Project**—NCEH funded the **MDPH Bureau of Environmental Health Assessment (BEHA)** to conduct three pilot demonstration projects under this cooperative agreement. The projects are 1) linking pediatric asthma surveillance with a database on indoor air quality (IAQ) data in schools, 2) linking developmental disability surveillance with polychlorinated biphenyl (PCB) compound environmental exposures and with biomarkers from a newborn screening database, and 3) linking systemic lupus erythematosus (SLE) surveillance with electronic environmental databases for specific pollutants of interest (e.g., petroleum distillates). Funding began in fiscal year 2002 and ends in fiscal year 2005.

- **Data Linkage Demonstration Project**—NCEH funded **MDPH/BEHA** to conduct three demonstration linkage projects as part of the development of the National Environmental Public Health Tracking (EPHT) Network. The overall purpose of these projects is to demonstrate and evaluate methods for linking data from existing health effects surveillance systems in **Massachusetts** with hazard and exposure data from existing surveillance and monitoring systems elsewhere. Methods, tools, and best practices developed through these projects will be used to advance the development of an EPHT network at the state, local, and national levels. Funding began in fiscal year 2003 and continues through fiscal year 2006.

  The Massachusetts program will implement three components. First, the program will link blood lead level data from the **Massachusetts Childhood Blood Lead Prevention Program** (**MA CLPPP**) surveillance system with environmental data on ambient air contaminants, lead smelters, and drinking water distribution systems. The initial effort will focus on linkage between blood lead level data and environmental data in high-risk communities. Approximately 86,000 children 0–4 years of age reside in 21 high-risk communities in Massachusetts.

  Second, the program will link childhood cancer incidence data from the **Massachusetts Cancer Registry** with drinking water quality and pesticide-use databases. Activities for surveillance of childhood cancer incidence include geocoding statewide cancer incidence data beginning in 1982. In addition, a protocol for statewide evaluation of linkage between childhood cancer and environmental databases will be developed.

  Third, the program will link birth defects data from the **Massachusetts Birth Defects Registry** and low-birth-weight data from the **Registry of Vital Records and Statistics** with drinking water quality data. MDPH/BEHA will develop a protocol for evaluating linkage between birth defects and low-birth-weight data with environmental databases. Drinking water quality databases will be evaluated for the feasibility of linkage.

Health Studies Activities

- **Emergency Response to Illnesses Among Young Children in School Lunch Program**—NCEH provided technical assistance to **MDPH** to help identify the agent or agents associated with reports of rapid onset vomiting in school children. On September 24, 2003, NCEH was notified of a cluster of rapid-onset gastrointestinal illnesses after a school lunch that day in **Framingham**. State epidemiologists conducted a cohort study, which revealed 33 ill students and implicated flour tortillas from Del Rey Tortilleria as the reason for the illness. Predominant symptoms included stomachache, nausea, headache, and dizziness; less common symptoms included vomiting, diarrhea, tingling in mouth, and bitter taste. Symptoms generally began within 1 hour of eating the meal and subsided within 4–5 hours. Samples of food from the school lunch were sent to the state laboratory, and six cases of tortillas from the caterer's supplier were embargoed. **Boston Inspectional Services** investigated the caterer.

  Acute and convalescent urine samples were collected from six children from the school. The company that catered the school lunch in Framingham catered identical lunches at three Boston schools on the same day. The **Boston Health Department** conducted an investigation at two of the other schools and found a similar syndrome among 32 additional students. Tortillas were implicated at one school; chicken fajitas, which were served with flour tortillas, were implicated at the other. Samples of foods left over from these lunches were also sent to the state laboratory and frozen.

Measuring Exposure to Environmental Chemicals

NCEH measures environmental chemicals in people to determine how to protect people and improve their health. Following are examples of such activities that NCEH conducted or supported in **Massachusetts**.

Funding

- **Antiterrorism Funding to Increase State Chemical Laboratory Capacity**—In fiscal year 2003, CDC provided $1 million to **Massachusetts** to help expand chemical laboratory capacity to prepare for and respond to chemical-terrorism incidents and other chemical emergencies. This

expansion will allow full participation of chemical-terrorism response laboratories in the Laboratory Response Network.

- **Biomonitoring Grants**—In fiscal years 2001 and 2002, NCEH awarded planning grants to **Massachusetts** to develop a plan for implementing a state biomonitoring program. In this way, the state could make decisions about which environmental chemicals within its borders were of health concern and could make plans for measuring levels of those chemicals in the Massachusetts population.

Studies

- **Mercury Chelation in Stored Study Samples**—Anecdotal reports indicate that succimer, an agent used to remove excess levels of some chemicals from the body, promotes the excretion of inorganic mercury in children and of methyl mercury in laboratory animals. A mercury chelation study, conducted in collaboration with **Harvard University**, will test the hypothesis that succimer binds to mercury and promotes its excretion. NCEH will analyze samples from the Treatment of Lead-exposed Children study to determine whether blood mercury levels also dropped among the children treated with succimer. If succimer is determined to be a chelating agent for mercury, it eventually may be used to treat children with mercury poisoning. This study is ongoing.

- **Household Exposure Follow-up Study**—Under a contract with **MDPH**, the **Silent Spring Institute** (**SSI**) conducted the Household Exposure Study (HES) as part of its Cape Cod Breast Cancer and Environment study. HES investigators collected urine samples from women participants, house-dust samples, and indoor-air samples. The urine was analyzed for specific target compounds (including phthalates and pesticides) selected on the basis of the likelihood that they were endocrine disruptors or carcinogens.

  NCEH measured three target analytes (or their metabolites) in urine samples for the initial HES study: 2,4-dichlorophenoxyacetic acid (2,4-D), di-2-ethylhexyl phthalate (DEHP), and 1-napthol. Several HES participants had substantially higher concentrations of house-dust or target compounds in indoor air than did other study participants. Therefore, MDPH and SSI agreed to evaluate the data further and determine which homes may have environmental or biologic contaminant levels of potential public health concern. MDPH and SSI will also evaluate potential sources of contamination and address possible health concerns through follow-up testing. NCEH will also measure these same analytes (or their metabolites) for the follow-up study. Results are expected by the end of 2004.

- **Phthalates, PCBs, and Semen Quality**—Working with **Harvard School of Public Health** in **Boston**, NCEH is recruiting men from couples seeking fertility evaluation at **Massachusetts General Hospital**. Because phthalates may have adverse reproductive health effects, levels of several phthalate metabolites are being measured in urine samples obtained from these participants.

  Since January 2000, NCEH has analyzed samples from approximately 260 men. Results showed that atypical human semen parameters and sperm DNA damage may be associated with exposure to certain phthalates. Four manuscripts describing the findings from this ongoing study were published in peer-reviewed journals in 2003 and 2004. Analyses and recruitment of subjects are ongoing.

- **Urinary Levels of Phthalate Metabolites Among Infants in Neonatal Intensive Care Units**—NCEH conducted a study in collaboration with **Harvard School of Public Health**, **Brigham and Women's Hospital**, **The Children's Hospital Boston**, and **Massachusetts General Hospital** to measure DEHP metabolites in urine samples from 54 randomly selected infants in two Boston hospital nurseries from March 1, 2003, through April 30, 2003. The infants were in the neonatal intensive care unit (NICU) at least 3 days before observation. The infants were classified as having low, medium, or high exposure to DEHP based on the number and type of medical devices containing DEHP to which the infant was exposed. DEHP metabolite levels were higher among male infants and infants with lower gestational age and longer stays in NICUs than in female infants and infants with shorter stays. Levels of the chemical were substantially higher the longer an infant was exposed to the devices or the greater the number of devices to which an infant was exposed.

- **Phthalate Exposure Among Workers in Nail Salons**—Manicurists are exposed to dibutyl phthalate (DBP), a chemical in nail polish. Working with **Simmons College** in **Boston**, NCEH will recruit manicurists from south suburban Boston. Participants will be selected both from salons with local-exhaust ventilation and from salons with no local source of ventilation. Levels of DBP metabolites will be measured in urine samples obtained from the manicurists.

  To date, NCEH has analyzed 39 samples from 21 manicurists; Simmons College representatives are recruiting more nail-salon workers. Data analyses and interpretation of the results are ongoing.

Services

- **Helping State Public Health Laboratories Respond to Chemical Terrorism**—NCEH is working with the public health laboratory in **Massachusetts** to prepare state laboratory scientists to measure chemical-terrorism agents or their metabolites in people's blood or urine. NCEH is transferring analytic methods for measuring chemical-terrorism agents (including cyanide-based compounds and other chemicals) to Massachusetts. In addition, NCEH instituted a proficiency-testing program to measure the comparability of the state's analytic results with results from the NCEH laboratory.

Preventing Health Effects That Result from Environmental Hazards

NCEH promotes safe environmental public health practices to minimize exposure to environmental hazards and prevent adverse health effects. Following are examples of such activities that NCEH conducted or supported in **Massachusetts**.

- **Childhood Lead Poisoning Prevention Program—MA CLPPP** has received NCEH funding since 1990. In 2001, the program screened 244,173 children for lead poisoning. The number of children under 6 years of age who had elevated blood lead levels decreased from 7,810 in 1997 to 3,620 in 2001. These decreases in blood lead levels are due to state program efforts funded in part by NCEH.

  MA CLPPP is using NCEH funds to develop and implement a childhood lead poisoning elimination plan and enhance its ability to report complete and accurate data through implementation of a new database system. Funds are also being used to increase primary prevention activities, assure appropriate case management follow-up, and develop strategic partnerships.

- **Environmental Health Services**—NCEH is funding the **Boston Public Health Commission** to enhance its capacity to identify and respond to environmental hazards. The project's goal is to reduce disproportionately negative environmental health impacts on people working in or living near small auto repair shops in Boston's most vulnerable neighborhoods. Such impacts include hazardous air quality, soil contamination, solid waste, and hazardous waste storage and disposal. Neighborhoods selected for this project ranked in the bottom 3 of the 16 Boston neighborhoods for 30 of 36 health and health-related indicators of the commission's *Health of Boston 2003* report.

  The commission's proposed intervention has six main components: planning and coordination with partners, assessment and mapping, material development, awareness and access, evaluating and monitoring, and policy and behavior change. Funding began in fiscal year 2004 and continues through fiscal year 2007.

For more information about NCEH programs, activities, and publications as well as other resources, contact the NCEH Health Line toll-free at 1-888-232-6789, e-mail NCEHinfo@cdc.gov, or visit the NCEH Web site at www.cdc.gov/nceh.